1885MNRAS..45..504M

Ephemeris for Physical Observations

Greenwich Noon.		Angle of Position of ♃'s Axis.	Latitude of Earth above ♃'s Equator.	Latitude of Sun above ♃'s Equator.	Annual Parallax.		Longitude of ♃'s Central Meridian. (878°·40)	Longitude of ♃'s Central Meridian. (870°·31)	Corr. for Phase.
		P	B	*B*	A−L.	L−O.	I	II	
1885.		°	°	°	°	°	°	°	°
Nov.	14	25·431	−1·992	−1·811	−8·305	44·459	154·20	355·48	+0·300
	19	·415	2·035	1·828	8·744	45·278	225·71	26·54	·333
	24	·396	2·077	1·844	9·140	46·054	297·29	57·66	·364
	29	·374	2·119	1·860	9·490	46·782	8·92	88·84	·392
Dec.	4	25·350	−2·160	−1·876	−9·789	47·461	80·62	120·08	+0·417
	9	·325	2·200	1·892	10·033	48·085	152·38	151·39	·438
	14	·300	2·238	1·908	10·220	48·651	224·21	182·77	·455
	19	·276	2·275	1·924	10·346	49·155	296·11	214·21	·466
	24	·253	2·311	1·940	10·406	49·594	8·07	245·72	·471
	29	·233	2·345	1·955	10·397	49·965	80·11	277·31	·470
1886.									
Jan.	3	25·216	−2·377	−1·971	−10·317	50·264	152·21	308·96	+0·463
	8	·203	2·407	1·987	10·162	50·488	224·39	340·68	·449
	13	·194	2·435	2·002	9·930	50·634	296·64	12·47	·429
	18	·190	2·460	2·018	9·619	50·702	8·95	44·33	·403
	23	·191	2·482	2·033	9·229	50·691	81·33	76·26	·371
	28	·196	2·502	2·048	8·759	50·600	153·78	108·25	·334
Feb.	2	25·206	−2·518	−2·063	− 8·211	50·430	226·28	140·30	+0·294
	7	·220	2·531	2·078	7·585	50·182	298·84	172·41	·251
	12	·238	2·541	2·093	6·885	49·862	11·44	204·56	·207
	17	·259	2·547	2·108	6·117	49·471	84·09	236·75	·163
	22	·281	2·548	2·123	5·285	49·018	156·77	268·98	·122
	27	·305	2·546	2·137	4·396	48·508	229·47	301·23	·084
Mar.	4	25·331	−2·540	−2·152	−3·459	47·951	302·18	333·49	+0·052
	9	·355	2·530	2·166	2·485	47·354	14·90	5·76	·027
	14	·377	2·516	2·180	1·484	46·729	87·61	38·01	·010
	19	·397	2·499	2·194	0·465	46·088	160·29	70·25	0·001
	24	·415	2·479	2·208	+0·560	45·442	232·94	102·45	−0·001
	29	·429	2·456	2·222	1·579	44·799	305·55	134·60	·011
Apr.	3	25·440	−2·431	−2·236	+2·581	44·177	18·09	166·70	−0·029
	8	·448	2·404	2·250	3·554	43·581	90·58	198·74	·055
	13	·453	2·376	2·264	4·489	43·023	162·99	230·70	·088
	18	·456	2·347	2·278	5·377	42·514	235·31	262·58	·126
	23	·457	2·318	2·291	6·210	42·059	307·56	294·37	·168
	28	·456	2·289	2·304	6·983	41·664	19·71	326·07	·213
May	3	25·455	−2·261	−2·318	+7·689	41·335	91·76	357·68	−0·258

1885MNRAS..45..504M

of Jupiter 1885–86. By A. Marth.

Greenwich Noon.		Diameter Equat.	Diameter Polar.	Difference of limbs in A. R.	Difference of limbs in Decl.	Defect of illumination. Equat.	Defect of illumination. in A. R. preced. limb	Defect of illumination. in Decl. north *l*.	*d*	*w*
1885.		″	″	s	″	″	s	″	°	°
Nov.	14	32·71	30·63	2·156	31·02	0·17	0·010	0·03	8·30	268·82
	19	33·07	30·97	2·179	31·36	·19	·011	·03	8·74	268·71
	24	33·46	31·33	2·205	31·73	·21	·012	·04	9·14	268·61
	29	33·87	31·72	2·233	32·12	·23	·013	·04	9·49	268·51
Dec.	4	34·31	32·13	2·262	32·54	0·25	0·014	0·04	9·79	268·41
	9	34·78	32·57	2·293	32·98	·27	·015	·05	10·03	268·32
	14	35·27	33·03	2·325	33·45	·28	·016	·05	10·22	268·23
	19	35·78	33·51	2·359	33·93	·29	·016	·05	10·35	268·13
	24	36·31	34·01	2·394	34·44	·30	·017	·05	10·41	268·03
	29	36·86	34·52	2·430	34·96	·30	·017	·05	10·40	267·92
1886.										
Jan.	3	37·43	35·05	2·468	35·49	0·30	0·017	0·05	10·32	267·81
	8	38·00	35·59	2·506	36·04	·30	·017	·05	10·16	267·68
	13	38·59	36·13	2·544	36·59	·29	·017	·05	9·93	267·54
	18	39·17	36·68	2·583	37·14	·28	·016	·04	9·62	267·39
	23	39·75	37·22	2·621	37·69	·26	·015	·04	9·23	267·22
	28	40·32	37·76	2·658	38·23	·24	·013	·04	8·76	267·03
Feb.	2	40·88	38·28	2·695	38·76	0·21	0·012	0·03	8·22	266·79
	7	41·41	38·78	2·730	39·27	·18	·010	·03	7·59	266·51
	12	41·91	39·24	2·763	39·74	·15	·009	·02	6·90	266·18
	17	42·37	39·67	2·793	40·18	·12	·007	·02	6·13	265·77
	22	42·78	40·06	2·820	40·57	·09	·005	·01	5·30	265·21
	27	43·14	40·39	2·843	40·91	·06	·004	·01	4·41	264·57
Mar.	4	43·43	40·67	2·863	41·19	0·04	0·002	0·00	3·48	263·24
	9	43·65	40·89	2·878	41·41	·02	·001		2·51	261·9
	14	43·82	41·04	2·888	41·56	·01	·000		1·53	256·4
	19	43·90	41·11	2·894	41·64	on following		on south	0·57	235·0
	24	43·91	41·12	2·895	41·65	limb		limb	0·63	117·3
	29	43·84	41·05	2·890	41·58	·01	·000	·00	1·60	99·0
Apr.	3	43·70	40·92	2·881	41·45	0·02	0·001	0·01	2·59	94·5
	8	43·48	40·72	2·867	41·24	·04	·002	·01	3·56	92·58
	13	43·20	40·46	2·849	40·98	·07	·004	·01	4·49	91·43
	18	42·86	40·14	2·827	40·65	·09	·005	·02	5·37	90·67
	23	42·47	39·77	2·801	40·28	·12	·007	·02	6·20	90·14
	28	42·03	39·36	2·772	39·86	·15	·009	·03	6·98	89·71
May	3	41·55	38·91	2·741	39·41	0·19	0·010	0·03	7·68	89·38

1885MNRAS..45..504M

Greenwich Noon.		Angle of Position of ♃'s Axis.	Latitude of Earth	Latitude of Sun	Annual Parallax.		Longitude of ♃'s Central Meridian.		Corr. for Phase.
			above ♃'s Equator.				(870°·40)	(870°·31)	
		P	B	*B*	Λ−L.	L−O.	I	II	
1886.		°	°	°	°	°	°		°
May	8	25·453	−2·234	−2·331	+8·324	41·077	163·72	29·19	−0·302
	13	·452	2·209	2·344	8 886	40·893	235·59	60·61	·344
	18	·451	2·186	2·357	9·372	40·784	307·36	91·94	·382
	23	·450	2·165	2·370	9·783	40·751	19·04	123·17	·417
	28	·450	2·146	2·383	10·119	40·793	90·63	154·31	·446
June	2	25·451	−2·130	−2·395	+10·381	40·909	162·13	185·37	−0·469
	7	·451	2·117	2·408	10·569	41·098	233·56	216·35	·486
	12	·452	2·106	2·420	10·686	41·359	304·91	247·25	·497
	17	·453	2·098	2·433	10·734	41·688	16 18	278·08	·501
	22	·453	2·093	2·445	10 717	42·082	87·39	308·85	·500
	27	·452	2·091	2·457	10·638	42·539	158·54	339·55	·492
July	2	25·449	−2·091	−2·469	+10·499	43·056	229·64	10·20	−0·480
	7	·444	2·094	2·481	10·303	43·629	300·68	40·80	·462
	12	·436	2·099	2·493	10·053	44·256	11·68	71·35	·440
	17	·423	2·107	2·505	9·754	44·932	82·64	101·86	·414
	22	·406	2·117	2·517	9·408	45·656	153·56	132·34	·385
	27	·384	2·129	2·528	9·018	46·423	224·46	162·79	·354
Aug.	1	25·358	−2·144	−2·539	+8·588	47·231	295·33	193·21	−0·321

The angle Λ−L is the difference of the Jovicentric longitudes of the Sun and the Earth, reckoned in the plane of *Jupiter's* equator, L−O+180° the Jovicentric longitude of the Earth reckoned from O, the point of *Jupiter's* vernal equinox or the point of the ascending node of the planet's orbit on its equator. Two values of the "Longitude of ♃'s Central Meridian" are given for each date, the first, computed with the daily rate of rotation 878°·40, being intended for comparing the observations of the white spots in the neighbourhood of the planet's equator; the second, computed with the rate 870°·31, for the observations of the remnant of the great reddish spot. As the variations of the motions of the white spot cannot yet be allowed for, on account of their apparent irregularities, I have adopted the daily rate 870°·40 as being the mean rate of rotation of the most persistent of the white spots from the autumn of 1880 to the spring of 1885, and have assumed the Zero Meridian so that it remains in the neighbourhood of that spot during the interval. I shall be ready to give the longitudes in the system of the present ephemeris, which correspond to the times of the observed passages of the white spots over the middle of the disc, when all, or nearly all, the observations have come to my knowledge. If the remnant of the great reddish spot should continue to rotate at the daily rate 870°·31, at which it has moved for more than two years,

1885MNRAS..45..504M

Greenwich Noon.	Diameter Equat.	Polar.	Difference of limbs in A. R.	in Decl.	Defect of illumination. Equat. preced. limb	in A. R.	in Decl. north *l*.	*d*	*w*
1886.	″	″	s	″	″	s	″	°	°
May 8	41·04	38·43	2·708	38·93	0·22	0·012	0·04	8·32	89·11
13	40·50	37·93	2·673	38·42	·24	·014	·04	8·88	88·88
18	39·95	37·41	2·636	37·89	·27	·015	·05	9·37	88·68
23	39·39	36·88	2·599	37·36	·29	·016	·05	9·78	88·51
28	38·82	36·35	2·562	36·82	·30	·017	·05	10·11	88·36
June 2	38·25	35·82	2·524	36·28	0·31	0·018	0·05	10·38	88·22
7	37·69	35·29	2·487	35·75	·32	·018	·05	10·57	88·09
12	37·14	34·77	2·450	35·22	·32	·018	·05	10·68	87·98
17	36·59	34·27	2·414	34·71	·32	·018	·05	10·73	87·87
22	36·07	33·77	2·379	34·21	·31	·018	·05	10·71	87·77
27	35·56	33·30	2·345	33·73	·30	·017	·05	10·63	87·67
July 2	35·07	32·84	2·312	33·26	0·29	0·017	0·05	10·50	87·58
7	34·60	32·40	2·281	32·82	·28	·016	·04	10·30	87·49
12	34·15	31·98	2·252	32·39	·26	·015	·04	10·05	87·39
17	33·73	31·58	2·224	31·99	·24	·014	·04	9·75	87·30
22	33·33	31·21	2·197	31·61	·22	·013	·04	9·41	87·20
27	32·95	30·86	2·172	31·25	·20	·012	·03	9·02	87·10
Aug. 1	32·60	30·53	2·149	30·92	0·18	0·011	0·03	8·59	87·00

its place will be found near the Zero Meridian of column II. of the values of the Longitude of ♃'s Central Meridian. The periods of rotation corresponding to the two adopted rates are

	°		h	m	s
I.	878·40	period	9	50	9·84
II.	870·31		9	55	38·99

The differences of successive values of the "Longitude, &c.," amount for the intervals of five days to 12 rotations in addition to the differences directly deduced, which must be borne in mind in interpolating. The differences of the values for Nov. 14 and Nov. 19 are, for instance, 4391°·50 and 4351°·06. The addition of the "Correction for phase" to the "Longitude of ♃'s Central Meridian" gives the longitude of the Meridian which bisects the illuminated disc. A list of Greenwich times when this longitude is 0° will be found farther on.

The assumed value of *Jupiter's* equatorial diameter is 37″·60 at the distance 5·00273, or the apparent diameter $2a$ at the distance Δ

$$2a = \frac{195''\cdot62}{\Delta}.$$

The assumed proportion of the polar axis to the equatorial diameter or $\cos \varepsilon_0$ is $=0\cdot9363$. The formulæ for finding the

1885MNRAS..45..504M

apparent polar diameter of the disc, the difference of the tangents to the limbs in A. R. and Declin., and the defects of illumination are (v. vol. xl. p. 490 ff):

$$\sin \epsilon = \sin \epsilon_0 \cos \mathrm{B} \qquad \tan \mathrm{B}_{,} = \sec \epsilon_0 \tan \mathrm{B}$$

$$\sin \nu_{,} = \sin \epsilon \sin \mathrm{P} \qquad \tan B' = \sec \epsilon_0 \tan B \sec (\Lambda - \mathrm{L})$$

$$\sin \nu' = \sin \epsilon \cos \mathrm{P} \qquad \tan d \sin w = \tan (\Lambda - \mathrm{L}) \cos B' \sec (\mathrm{B}_{,} - B')$$

$$\tan \mathrm{P}_{,} = \cos \epsilon \tan \mathrm{P} \qquad \tan d \cos w = \tan (\mathrm{B}_{,} - B')$$

$$\tan \mathrm{P}' = \sec \epsilon \tan \mathrm{P}$$

$$\sin \delta = \sin d \sin w \qquad \sin \delta'' = \sin d \cos w$$

$$\sin \delta_{,} = \sin d \sin (w + \mathrm{P}_{,}) \qquad \sin \delta' = \sin d \cos (w + \mathrm{P}')$$

App. equat. diameter $= 2a$ Defect of illum. $= 2a \,.\, \sin^2 \tfrac{1}{2}\delta$

App. polar diameter $= 2a \cos \epsilon$ $= 2a \cos \epsilon \,.\, \sin^2 \tfrac{1}{2}\delta''$ (insensible)

Diff. of limbs in A.R. $= \dfrac{2a \cos \nu_{,}}{15 \cos D}$ $= \dfrac{2a \cos \nu_1}{15 \cos D} \,.\, \sin^2 \tfrac{1}{2}\delta_1$

,, in Decl. $= 2a \cos \nu'$ $= 2a \cos \nu' \,.\, \sin^2 \tfrac{1}{2}\delta'$

The values of δ, &c., are, of course, not wanted, and, with the help of a little table giving

$$\log \frac{1}{4 \cos^2 \frac{1}{2}\delta}$$

belonging to the argument $\log \sin^2 \delta$, the values of $\sin^2 \frac{1}{2}\delta$ are found by the formula

$$\frac{\sin^2 \delta}{4 \cos^2 \frac{1}{2}\delta}.$$

The inclinations γ and the ascending nodes Γ of the orbits of the four satellites of *Jupiter* in reference to the plane of the planet's equator are the following, the longitudes of the nodes being reckoned from O, the point of the ascending node of *Jupiter's* orbit on its equator :—

1885.	γ_1	Γ_1	γ_2	Γ_2	γ_3	Γ_3	γ_4	Γ_4
Sept. 15	0°·0116	305°·2	0°·4895	307°·29	0°·1545	252°·54	0°·3187	329°·91
Nov. 14	·0116	303·7	·4900	305·39	·1536	252·31	·3191	329·93
1886.								
Jan. 13	0·0117	302·3	0·4905	303·49	0·1527	252·09	0·3195	329·97
Mar. 14	·0118	300·9	·4910	301·60	·1518	251·87	·3198	330·03
May 13	·0118	299·5	·4914	299·21	·1508	251·64	·3201	330·10
July 12	·0118	298·2	·4918	297·83	·1498	251·41	·3203	330·19
Sept. 10	0·0118	296·9	0·4921	295·94	0·1487	251·17	0·3205	330·29

The values for the preceding two years are given in the "Note on the Determination of the Planes of the Orbits of *Jupiter's* Satellites," published in vol. xliv. p. 241 ff. At the

1885MNRAS..45..504M

end of that note it is pointed out that observers ought to be on the alert in 1886 to get complete observations of some of the last eclipses of the present cycle of eclipses of the fourth satellite. If, as is very probable, the tabular value of the node of that satellite's orbit on the orbit of *Jupiter* requires a very sensible positive correction, the durations of the last eclipses as given by the Tables will not only be found considerably too short, but there will be at least one additional eclipse on May 17 not given by the Tables, and there may be a second unpredicted one of short duration on June 3. It is not unlikely that the errors of the predicted times of the eclipse on March 11 may already amount to a quarter of an hour, the satellite disappearing so much earlier and reappearing so much later than the times set down in the *Nautical Almanac*, and these errors will then be considerably increased in the following eclipses, so that observers will have to look out early enough for the disappearance and watch long enough for the reappearance of the satellite. It is to be hoped that the opportunities for securing valuable observations will not be allowed to slip away unused by observers in Europe on March 11 and May 17 (middle of eclipse of uncertain duration at $11^h\ 26^m{\cdot}8$ G.M.T.), in Asia on March 28 and June 3 (middle of possible eclipse at $5^h\ 25^m{\cdot}1$ G.M.T.), in Australia on April 13 and in America on April 30. It is obvious that the times of corresponding phases at disappearance and reappearance must be observed, if good results are to be deduced.

The following is a list of Greenwich Mean Times, when the Zero Meridian in the assumed two systems of longitudes will pass the middle of the illuminated disc. To save printing, the time of only one passage is given for each day, and the others must be found by interpolation, or, if greater accuracy is not required, by adding or subtracting $9^h\ 50^m$ in the first system and $9^h\ 56^m$ in the second.

	I.	II.		I.	II.
	(878°·40)	(870°·31)		(878°·40)	(870°·31)
1885	h m	h m	1885	h m	h m
Nov. 9	17 24·4	20 49·8	Nov. 20	19 0·5	14 58·4
10	22 55·1	16 41·2	21	14 40·9	20 45·5
11	18 35·5	22 28·8	22	20 11·6	16 36·0
12	14 16·0	18 19·4	23	15 52·0	22 24·9
13	19 46·7	14 11·3	24	21 22·6	18 15·4
14	15 27·1	19 58·4	25	17 3·1	14 6·8
15	20 57·8	15 49·8	26	12 43·5	19 53·9
16	16 38·3	21 37·0	27	18 14·1	15 45·3
17	22 8·9	17 28·4	28	13 54·5	21 32·3
18	17 49·4	13 19·8	29	19 25·1	17 23·7
19	13 29·8	19 6·9	30	15 5·5	13 15·1

1885MNRAS..45..504M

		I.		II.	
		(878°·40)		(870°·31)	
1885		h	m	h	m
Dec.	1	20	36·1	19	2·2
	2	16	16·5	14	53·5
	3	21	47·1	20	40·6
	4	17	27·5	16	32·0
	5	13	7·9	12	23·3
	6	18	38·5	18	10·4
	7	14	18·9	14	1·7
	8	19	49·5	19	48·8
	9	15	29·9	15	40·1
	10	21	0·4	21	27·1
	11	16	40·8	17	18·5
	12	12	21·1	13	9·8
	13	17	51·7	18	56·8
	14	13	32·0	14	48·2
	15	19	2·6	20	35·2
	16	14	42·9	16	26·5
	17	20	13·5	12	17·8
	18	15	53·8	18	4·8
	19	11	34·1	13	56·1
	20	17	4·7	19	43·1
	21	12	45·0	15	34·4
	22	18	15.5	11	25·7
	23	13	55·8	17	12·6
	24	19	26·3	13	3·9
	25	15	6·6	18	50·9
	26	20	37·1	14	42·2
	27	16	17·4	20	29·1
	28	11	57·8	16	20·4
	29	17	28·2	12	11·7
	30	13	8·5	17	58·6
	31	18	39·0	13	49·9
1886.					
Jan.	1	14	19·3	19	36·8
	2	19	49·7	15	28·0
	3	15	30·0	11	19·3
	4	11	10·3	17	6·2
	5	16	40·7	12	57·5
1836.		h	m	h	m
Jan.	6	12	21·0	18	44·3
	7	17	51·4	14	35·6
	8	13	31·7	10	26·8
	9	19	2·1	16	13·7
	10	14	42·4	12	4·9
	11	10	22·6	17	51·8
	12	15	53·0	13	43·0
	13	11	33·3	19	29·9
	14	17	3·7	15	21·1
	15	12	43·9	11	12·3
	16	18	14·3	16	59·2
	17	13	54·5	12	50·4
	18	19	24·9	18	37·2
	19	15	5·1	14	28·4
	20	10	45·4	10	19·6
	21	16	15·7	16	6·4
	22	11	56·0	11	57·6
	23	17	26·3	17	44·4
	24	13	6·5	13	35·6
	25	8	46·7	9	26·8
	26	14	17·1	15	13·6
	27	9	57·3	11	4·8
	28	15	27·6	16	51·5
	29	11	7·8	12	42·7
	30	16	38·1	18	29·5
	31	12	18·3	14	20·6
Feb.	1	17	48·6	10	11·8
	2	13	28·8	15	58·6
	3	9	9·0	11	49·7
	4	14	39·3	17	36·5
	5	10	19·5	13	27·6
	6	15	49·7	9	18·8
	7	11	29·9	15	5·5
	8	17	0·2	10	56·7
	9	12	40·4	16	43·4
	10	8	20·6	12	34·5
	11	13	50·8	8	25·7

1885MNRAS..45..504M

1886		I. (878°·40)		II. (870°·31)	
		h	m	h	m
Feb.	12	9	31·0	14	12·4
	13	15	1·2	10	3·5
	14	10	41·4	15	50·2
	15	16	11·7	11	41·4
	16	11	51·8	17	28·1
	17	17	22·1	13	19·2
	18	13	2·2	9	10·3
	19	8	42·4	14	57·0
	20	14	12·6	10	48·1
	21	9	52·8	16	34·8
	22	15	23·0	12	25·9
	23	11	3·1	8	17·1
	24	16	33·4	14	3·7
	25	12	13·5	9	54·8
	26	17	43·7	15	41·5
	27	13	23·9	11	32·6
	28	9	4·0	7	23·8
Mar.	1	14	34·2	13	10·4
	2	10	14·4	9	1·5
	3	15	44·6	14	48·2
	4	11	24·7	10	39·3
	5	16	55·0	16	26·0
	6	12	35·1	12	17·1
	7	8	15·2	8	8·2
	8	13	45·5	13	54·9
	9	9	25·6	9	46·0
	10	14	55·8	15	32·6
	11	10	36·0	11	23·8
	12	6	16·1	7	14·9
	13	11	46·3	13	1·5
	14	7	26·5	8	52·6
	15	12	56·7	14	39·3
	16	8	36·8	10	30·4
	17	14	7·0	16	17·1
	18	9	47·2	12	8·2
	19	15	17·4	7	59·3
	20	10	57·6	13	46·0
Mar.	21	6	37·7	9	37·1
	22	12	7·9	15	23·8
	23	7	48·1	11	15·0
	24	13	18·3	7	6·1
	25	8	58·5	12	52·8
	26	14	28·8	8	43·9
	27	10	8·9	14	30·6
	28	15	39·2	10	21·8
	29	11	19·4	6	12·9
	30	6	59·5	11	59·6
	31	12	29·8	7	50·8
Apr.	1	8	10·0	13	37·5
	2	13	40·3	9	28·7
	3	9	20·5	15	15·4
	4	14	50·8	11	6·6
	5	10	31·0	6	57·8
	6	6	11·2	12	44·5
	7	11	41·5	8	35·7
	8	7	21·7	14	22·5
	9	12	52·0	10	13·7
	10	8	32·3	6	4·9
	11	14	2·6	11	51·7
	12	9	42·9	7	42·9
	13	15	13·2	13	30·7
	14	10	53·4	9	20·9
	15	6	33·7	15	7·7
	16	12	4·1	10	58·9
	17	7	44·3	6	50·2
	18	13	14·7	12	37·0
	19	8	55·0	8	28·2
	20	14	25·4	14	15·1
	21	10	5·7	10	6·4
	22	15	36·1	15	53·2
	23	11	16·4	11	44·5
	24	6	56·8	7	35·8
	25	12	27·1	13	22·7
	26	8	7·4	9	13·

1885MNRAS..45..504M

1886		I. (878°·40) h	m	II. (870°·31) h	m
Apr.	27	13	37·9	15	0·8
	28	9	18·2	10	52·1
	29	14	48·7	16	39·1
	30	10	29·0	12	30·4
	—	17	28·4	Middle	
		of last tabular eclipse of Sat. IV.			
May	1	15	59·5	8	21·6
	2	11	39·8	14	8·6
	3	7	20·2	9	59·9
	4	12	50·7	15	46·9
	5	8	31·0	11	38·2
	6	14	1·5	7	29·5
	7	9	41·9	13	16·5
	8	15	12·4	9	7·9
	9	10	52·8	14	54·9
	10	16	23·4	10	46·2
	11	12	3·8	16	33·2
	12	7	44·1	12	24·6
	13	13	14·7	8	16·0
	14	8	55·1	14	3·0
	15	14	25·7	9	54·4
	16	10	6·1	15	41·4
	17	11	26·8	? Middle	
		of eclipse of Sat. IV.			
	—	15	36·7	11	32·8
	18	11	17·1	7	24·2
	19	6	57·5	13	11·3
	20	12	28·2	9	2·7
	21	8	8·6	14	49·8
	22	13	39·2	10	41·2
	23	9	19·7	16	28·3
	24	14	50·3	12	19·7
	25	10	30·8	8	11·1
	26	16	1·5	13	58·2
	27	11	42·9	9	49·7
	28	7	22·4	15	36·8
May	29	12	53·1	11	28·2
	30	8	33·5	7	19·7
	31	14	4·2	13	6·8
June	1	9	44·7	8	58·3
	2	15	15·4	14	45·5
	3	5	25·1	? Middle	
		of eclipse of Sat. IV.			
	—	10	55·9	10	36·9
	4	6	36·4	6	28·4
	5	12	7·1	12	15·6
	6	7	47·6	8	7·0
	7	13	18·4	13	54·3
	8	8	58·9	9	45·7
	9	14	29·6	15	32·9
	10	10	10·1	11	24·4
	11	15	40·9	7	15·9
	12	11	21·4	13	3·1
	13	7	1·9	8	54·6
	14	12	32·7	14	41·9
	15	8	13·2	10	33·4
	16	13	44·0	6	24·9
	17	9	24·6	12	12·1
	18	14	55·4	8	3·7
	19	10	35·9	13	50·9
	20	6	16·4	9	42·4
	21	11	47·2	5	34·0
	22	7	27·8	11	21·2
	23	12	58·6	7	12·8
	24	8	39·2	13	0·1
	25	14	10·0	8	51·6
	26	9	50·6	14	38·9
	27	5	31·1	10	30·4
	28	11	2·0	6	22·0
	29	6	42·5	12	9·3
	30	12	13·4	8	0·8
July	1	7	54·0	13	48·1
	2	13	24·8	9	39·7

1885MNRAS..45..504M

1886		I. (878°·40) h m	II. (870°·31) h m	1886		I. (878°·40) h m	II. (870°·31) h m
July	3	9 5·4	15 27·0	July	20	14 17·9	14 34·2
	4	14 36·3	11 18·6		21	9 58·5	10 25·8
	5	10 16·9	7 10·1		22	5 39·1	6 17·4
	6	5 57·4	12 57·5		23	11 10·0	12 4·8
	7	11 28·3	8 49·0		24	6 50·7	7 56·4
	8	7 8·9	14 36·4		25	12 21·6	13 43·8
	9	12 39·8	10 27·9		26	8 2·2	9 35·4
	10	8 20·4	6 19·5		27	13 33·1	5 27·0
	11	13 51·3	12 6·9		28	9 13·8	11 14·4
	12	9 31·9	7 58·4		29	14 44·7	7 6·0
	13	5 12·5	13 45·8		30	10 25·3	12 53·4
	14	10 43·4	9 37·4		31	6 5·9	8 45·0
	15	6 24·0	5 28·9	Aug.	1	11 36·9	14 32·4
	16	11 54·9	11 16·3		2	7 17·5	10 24·0
	17	7 35·5	7 7·9		3	12 48·5	6 15·6
	18	13 6·4	12 55·3		4	8 29·1	12 3·0
	19	8 47·0	8 46·9				

Ephemerides of the Satellites of Saturn, 1885–86. By A. Marth.

(*Continued from page* 462.)

Differences of Right Ascension and Declination between the three outer Satellites and the Centre of Saturn.

0h Gr. 1885.		Titan. $\alpha_6 - A$ s	Titan. $\delta_6 - D$ ″	Hyperion. $\alpha_7 - A$ s	Hyperion. $\delta_7 - D$ ″	Iapetus. $\alpha_8 - A$ s	Iapetus. $\delta_8 - D$ ″
Dec.	1	− 4·79	− 92·3	+ 6·65	+ 102·8	+ 24·83	− 49·4
	2	+ 0·83	− 89·8	+ 1·05	+ 100·1	+ 27·61	− 37·0
	3	+ 6·34	− 74·5	− 4·67	+ 86·3	30·22	− 24·3
	4	+ 10·95	− 48·5	− 9·83	+ 62·1	+ 32·65	− 11·4
	5	+ 13·96	− 15·3	− 13·76	+ 30·2	34·88	+ 1·6
	6	+ 14·87	+ 20·2	− 15·96	− 5·7	+ 36·91	+ 14·6
	7	+ 13·47	+ 52·6	− 16·22	− 41·1	38·72	27·6
	8	+ 9·90	+ 76·6	− 14·63	− 71·9	+ 40·30	+ 40·6
	9	+ 4·70	+ 88·0	− 11·51	− 95·5	41·65	53·4
	10	− 1·30	+ 84·7	− 7·36	− 110·3	+ 42·74	+ 65·8
	11	− 7·09	+ 67·1	− 2·56	− 115·9	43·57	77·9
	12	− 11·71	+ 38·3	+ 2·45	− 112·8	+ 44·14	+ 89·7